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| Company: | US Patent & Trademark Ofc. | Date: | June 13, 2002 |
| Telephonic Number: | 703-305-3524 | Number of pages following: | 25 |
| Fax Number: | 703-308-4556 | If you have problems with this fax transmission please contact: | Elizabeth Miller 650/485-4125 |

MESSAGE: RE: US Application No. 09/359,527, Filed July 22, 1999
Attorney Docket No. 10990641-1

Attached, per our phone conversation of June 12, 2002, are the documents for the above-referenced US application which were originally faxed to Examiner Arden Marschel, Tech Center #1600 on March 25, 2002, in response to the outstanding Office Action mailed October 23, 2001. The PTO confirmation sheet is included.

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Page 001

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|  Agilent Technologies | | | | | |
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| <h1>Fax Cover Sheet</h1> | | | | | |
| TO: | Examiner Arden Marchel Tech Center #1600 | FROM: | Gordon Stewart Fax # 650/485-5487 | | |
| DATE: | US Patent & Trademark Ofc. | DATE: | March 25, 2002 | | |
| TELEPHONE NUMBER: | 703-300-3934 | PAGES: | 23 | | |
| FAX NUMBER: | 703-872-9306 | IF YOU HAVE PROBLEMS WITH THIS FAX TRANSMISSION PLEASE CONTACT: | Elizabeth Miller 650485-4125 | | |
| MESSAGE: RE: US Application No. 09/359,527, Filed July 22, 1999 Attorney Docket No. 10890641-1 | | | | | |
| Accompanying this are the following documents for the subject patent application: | | | | | |
| 1. Transmittal Letter for Responses/Amendments, and 1 copy 2. Petition for Extension of Time 3. Response and Amendment, 20 pages | | | | | |
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MESSAGE: RE: US Application No. 09/359,527, Filed July 22, 1999
Attorney Docket No. 10990641-1

Accompanying this are the following documents for the subject patent application:

1. Transmittal Letter for Response/Amendment, and 1 copy
2. Petition for Extension of Time
3. Response and Amendment, 20 pages

CERTIFICATE OF FILING BY ELECTRONIC FACSIMILE TRANSMISSION

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Elizabeth Miller

March 25, 2002
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AGILENT TECHNOLOGIES, INC.
Legal Department, DL429
Intellectual Property Administration
P. O. Box 7599
Loveland, Colorado 80537-0599

PATENT APPLICATION

ATTORNEY DOCKET NO. 10990641-1

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Peter G. Webb et al.

Serial No.: 09/359,527

Examiner: Arden Marschel

Filing Date: July 22, 1999

Group Art Unit: 1631

Title: BIOPOLYMER ARRAYS AND THEIR FABRICATION

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COMMISSIONER FOR PATENTS
Washington, D.C. 20231

TRANSMITTAL LETTER FOR RESPONSE/AMENDMENT

Sir:

Transmitted herewith is/are the following in the above-identified application:

- (X) Response/Amendment (X) Petition to extend time to respond
() New fee as calculated below () Supplemental Declaration
() No additional fee (Address envelope to "Box Non-Fee Amendments")
() Other: _____ (fee \$ _____)

| CLAIMS AS AMENDED BY OTHER THAN A SMALL ENTITY | | | | | | |
|--|--|------------------------|--|-------------------------|-------------|---------------------------|
| (1) FOR | (2) CLAIMS REMAINING AFTER AMENDMENT | (3) NUMBER EXTRA | (4) HIGHEST NUMBER PREVIOUSLY PAID FOR | (5) PRESENT EXTRA | (6) RATE | (7) ADDITIONAL FEES |
| TOTAL CLAIMS | 19 | MINUS | 45 | = 0 | X \$18 | \$ 0 |
| INDEP. CLAIMS | 5 | MINUS | 8 | = 0 | X \$84 | \$ 0 |
| [] FIRST PRESENTATION OF A MULTIPLE DEPENDENT CLAIM | | | | | + \$280 | \$ 0 |
| EXTENSION FEE | 1ST MONTH \$110.00 | 2ND MONTH \$400.00 | 3RD MONTH \$920.00 | 4TH MONTH \$1440.00 | | \$ 400 |
| OTHER FEES | | | | | | \$ |
| TOTAL ADDITIONAL FEE FOR THIS AMENDMENT | | | | | | \$ 400 |

Charge \$ 400 to Deposit Account 50-1078. At any time during the pendency of this application, please charge any fees required or credit any overpayment to Deposit Account 50-1078 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 50-1078 under 37 CFR 1.16, 1.17, 1.19, 1.20 and 1.21. A duplicate copy of this sheet is enclosed.

I hereby certify that this paper is being facsimile transmitted to the Patent and Trademark Office on the date shown below.

Date of Facsimile: March 25, 2002

Typed Name: Elizabeth Miller

Signature: Elizabeth Miller

Respectfully submitted,

Peter G. Webb et al.

By Gordon M. Stewart

Gordon M. Stewart

Attorney/Agent for Applicant(s)

Reg. No. 3,528

Date: March 25, 2002

Telephone No.: (65) 485-2386

Rev 01/02 (TrAmdFax)

- Attach as First Page to Transmitted Papers -

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Elizabeth Miller
Elizabeth MillerMarch 25, 2002
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ATTORNEY DOCKET NO. 10990641-1

Plunkett

6/20/02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICEIn re Application of: Peter G. Webb *et al.*

Group Art Unit: 1631

Serial No.: 09/359,527

Examiner: Arden Marschel
(formerly Jeffrey Lundgren)

Filed: 07/22/99

Title: BIOPOLYMER ARRAYS AND THEIR FABRICATION

Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

AMENDMENT AND RESPONSE

Please amend the present application by canceling claims 1, ~~7~~, ~~15~~, ~~16~~, ~~18~~, 19, 46-48 and amending other of the claims as indicated in the attached APPENDIX. In accordance with 37 CFR 1.121(c)(3) a clean copy of all of the claims as now pending is below:

2. (AMENDED) A method according to claim 10, additionally comprising operating the deposition apparatus according to the corrected drive pattern.

3. (AMENDED) A method according to claim 10 wherein the probes are DNA or RNA probes.

4. (AMENDED) A method according to claim 10 additionally comprising saving the target drive pattern in a memory of the deposition apparatus.

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Sup D2
5. (AMENDED) A method according to claim 10 additionally comprising saving the target drive pattern in a memory of the deposition apparatus, and wherein the corrected drive pattern is saved in the memory.

C1
6. (AMENDED) A method according to claim 10 wherein the corrected drive pattern is derived without obtaining a target drive pattern.

C2
Sub D3
8. (TWICE AMENDED) A method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus, provides the probes on the substrate in the target array pattern, the method comprising:

- (a) examining at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited;
- (b) when an error is detected deriving, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns; and
- (c) operating the deposition apparatus according to the corrected drive pattern so as to fabricate the array;

wherein:

the deposition apparatus includes a dispensing head to dispense fluid droplets containing the probes or probe precursors, and a transport system to move at least one of the dispensing head and substrate relative to the other as the droplets are dispensed from the head, so as to form the array;

the target drive pattern controls operation of the transport system; and

the operating parameter is the position of the dispensing head, which is examined by viewing the dispensing head.

C3
13
12
(AMENDED) A method according to claim 12 wherein the operating parameter is examined by viewing a fiducial mark on the dispensing head.

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Sub 24
10. (AMENDED) A method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus, provides the probes on the substrate in the target array pattern, the method comprising:

- (a) examining at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited;
- (b) when an error is detected deriving, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns; and
- (c) operating the deposition apparatus according to the corrected drive pattern so as to fabricate the array;

wherein:

the deposition apparatus includes a dispensing head with multiple nozzles to dispense fluid droplets containing the probes or probe precursors, and a transport system to move at least one of the dispensing head and substrate relative to the other as the droplets are dispensed from the head, so as to form the array;

the drive pattern controls operation of the transport system;

C3
the at least one operating parameter is the position of the substrate or dispensing head, or orientation of a nozzle, and is examined by viewing the dispensing head, or nozzle, or a droplet pattern previously dispensed from the head.

C4
Sub 24
11. (AMENDED) A method according to claim 4 additionally comprising saving the target drive pattern in a memory of the deposition apparatus, and wherein the corrected drive pattern is saved in the memory, prior to operating the dispensing head and transport system to form the array.

12. (AMENDED) A method according to claim 4 additionally comprising saving the target drive pattern in a memory of the deposition apparatus, and wherein the corrected drive pattern is derived by modifying, based on the detected error, instructions to at least one deposition apparatus component based on the target drive

C

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pattern during operation of the dispensing head and transport system to form the array.

13. (AMENDED) A method according to claim 10 wherein the at least one operating parameter is examined by viewing the droplet pattern previously dispensed from the head.

14. (AMENDED) A method according to claim 10 wherein the at least one operating parameter is a position of the dispensing head.

17. (AMENDED) A method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus, provides the probes on the substrate in the target array pattern, the method comprising:

- (a) examining at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited;
- (b) when an error is detected deriving, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns; and
- (c) operating the deposition apparatus according to the corrected drive pattern so as to fabricate the array;

wherein:

the deposition apparatus includes a dispensing head with multiple nozzles to dispense fluid droplets containing the probes or probe precursors, and a transport system to move at least one of the dispensing head and substrate relative to the other as the droplets are dispensed from the head, so as to form the array;

the drive pattern controls operation of the transport system;

and wherein the at least one parameter is a position of a nozzle which is examined by viewing the nozzle, or a droplet pattern previously dispensed from the head.

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C6
Sub
D6

49. (AMENDED) A method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus, provides the probes on the substrate in the target array pattern, the method comprising:

- (a) examining at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited;
- (b) when an error is detected deriving, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns; and
- (c) operating the deposition apparatus according to the corrected drive pattern so as to fabricate the array;

wherein the operating parameter is a fluid volume dispensed by the deposition apparatus.

C17
Sub
D6

50. (AMENDED) A method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus, provides the probes on the substrate in the target array pattern, the method comprising:

- (a) examining at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited;
- (b) when an error is detected deriving, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns; and
- (c) operating the deposition apparatus according to the corrected drive pattern so as to fabricate the array;

wherein the operating parameter is a position of a component which varies due to thermal expansion.

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Attorney Docket No. 10990641-1

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51. (AMENDED) A method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus, provides the probes on the substrate in the target array pattern, the method comprising:

- CS
SUP
D6
- (a) examining at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited;
 - (b) when an error is detected deriving, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns; and
 - (c) operating the deposition apparatus according to the corrected drive pattern so as to fabricate the array;

wherein:

the deposition apparatus includes a dispensing head to dispense fluid droplets containing the probes or probe precursors, and a transport system to move at least one of the dispensing head and substrate relative to the other as the droplets are dispensed from the head, so as to form the array;

the apparatus further includes an encoder to provide data on the location of the substrate or head; and

the at least one operating parameter is an encoder error.

52. (AMENDED) A method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus, provides the probes on the substrate in the target array pattern, the method comprising:

- (a) examining at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited;

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- (b) when an error is detected deriving, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns; and
- (c) operating the deposition apparatus according to the corrected drive pattern so as to fabricate the array;
- wherein:

the deposition apparatus includes a dispensing head with multiple nozzles to dispense fluid droplets containing the probes or probe precursors, and a transport system to move at least one of the dispensing head and substrate relative to the other as the droplets are dispensed from the head, so as to form the array;

the drive pattern controls operation of the transport system;

the operating parameter is the position of the dispensing head, or orientation of a nozzle, and is examined by viewing the dispensing head, or nozzle.

C8
SUP
DN
55. A method according to claim 49 wherein the deposition apparatus comprises multiple jets for dispensing droplets, and wherein the corrected drive pattern comprises an instruction to switch to a different jet when a deviation from nominal volume is encountered for one jet which is more than a predetermined tolerance.

C9
SUB
DN
56. (AMENDED) A method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus, provides the probes on the substrate in the target array pattern, the method comprising:

- (a) examining at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited;
- (b) when an error is detected deriving, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns; and
- (c) operating the deposition apparatus according to the corrected drive pattern so as to fabricate the array;
- C